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(54) Title: SYNTHETIC GENE ENCODING RHESUS MONKEY CARCINOEMBRYONIC ANTIGEN AND USES THEREOF

## Rhesus Monkey CEA Codon-Optimized Nucleotide Sequence

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1 ATGGGAGGCC CAGGGCCCC CCTGCACCGC TGGTGCATCC CCTGGCAGAC
101 CCTGCTGCTG ACCGCCAGCC TGCTGACCTT CTGGAAACCC CCCACCAACCG
201 CCCAGCTGAC CATCGAGAG CGGCCCTTCA ACCTGAGGCGA GGGCAAGGAG
301 GTGCTGCTG TGCCCCAACAA CTGTGAGGAG AACCTGTTGC GCTACATCTG
401 ATCAGCTTCA CGCCGAGCT GCTGATCCAC AACGTGACCC AGAGCGACAC
501 CGGCAGCTAC ACCATCAGG TGATCAAGGA GGACCTGTTG AACGAGGAGG
601 CCACCGCCA GTTCCGGTGC TACCCGAGGC TGCCCAAGGC CTACATCAGC
701 AGCAACAAACCA GCAACCCCGT GGAGGACAAAG GAGCCGGTGG CCCCTGACCTG
801 CGAGCCCGAG ACCCAGGACA CCACCTACCT GTGGTGGTG AACAAACAGA
901 GCTGCGCTG AGGCCCCCCC CTGGAGCTGA CGAGCGACAA CGCCACCTG
1001 ACCGTGTTCA ACATCCCCCA CAAACGACACC ACCAGCTTACA AGTGGAGGAC
1101 CCAGTGGAGA CAAGGAGGCC GTGACCCCTGA CTGGGAGGCC CGAGACCCAG
1201 GACACCACCT ACCTGTGGT GGTGAACAAAC CAGAGCTGTA GCGTGAGCAG
1301 CGGCGCTGAG CTGAGCAACG ACAACCGCAC CCTGAGCGCTG TTCAACATCC
1401 CCCGCAAGGA CACCAACCTTC TAGAGTGCCTG AGACCCAGAA CCCCGTGTGAGC
1501 GTGCGCCGCA GGGACCCCGT GACCCCTGAAAC GTGCTGTACG GCCCCGAGGC
1601 CCCACCATC AGCCCCCTCA ACCACCCCTTA CGCCGGCGGA GAGAACCTGTA
1701 ACCCTGAGCTG CCACGCCCGG AGCAACCCCG CGCCCGTACG CAGCTGGTC
1801 GTGACACGCCA CTTCCAGCA GAGCACCCAG GAGCTGTCTA TCCCCAACAT
1901 CACCGTGAAC AACAGCGGCA GTATCATGTG CCAAGCCCAAC AACAGCGGCA
2001 CGGCGCTGAA CAACATCAGG TGAGCAGGG ACCTGCTTCAAC GAGAACACCCG
2101 AACATCAGG TGAGCAGGG GAGAACAGGG GAGCCGCAAG CGAGGAGC
2201 CGGTGACCTTGAA GAGAACAGGG GAGAACAGGG GAGCCGCAAG CGAGGAGC
2301 CGCGACCTGAA GCTACCGCAG CGGGCCCAAC CTGAACCTGAA GCTGCCACAG
2401 CGACAGCAAC CCCAGCCCCC AGTACAGCTG GCTGATCAAC GGCACCCCTGC
2501 GCGACACAC CCAGGTGCTG TTCACTAGCA AGATCAGGAG CAACAAACAGC
2601 GGCACCGCTACG CCGTGTGAGC GAGCAACCTG GGCACCCGGC GCAACAAACAG
2701 CATGCTGAAG AACATCAGG TGAGCAGGG GAGAACAGGG GAGCCGCAAG CGAGGAGC
2801 GCGGCTGAG CGGGCCGGCC ACCGTGGGCA TCATCATGG CATGCTGGT
2901 GGCCTGGCCC TGATGTGA (SEQ ID NO:1)

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(57) Abstract: Synthetic polynucleotides encoding rhesus monkey carcinoembryonic antigen (CEA) are provided, the synthetic polynucleotides being codon-optimized for expression in a human cellular environment. The gene encoding CEA is commonly associated with the development of human carcinomas. The present invention provides compositions and methods to elicit or enhance immunity to the protein product expressed by the CEA tumor-associated antigen, wherein aberrant CEA expression is associated with a carcinoma or its development. This invention specifically provides adenoviral vector and plasmid constructs carrying codon-optimized rhesus monkey CEA and discloses their use in vaccines and pharmaceutical compositions for preventing and treating cancer.



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